

TRANSLATION (HKH-76PCT):

WO 2007/076,838 A2

PCT/DE2006/002, :28

FLOATING DEVICE FOR TRANSPORTING AND
TRANSFERRING CONTAINERS

The invention pertains to a self-driven device for transporting and transshipping containers, which is designed as a floating object provided with at least one crane comprising at least one vertical element, a slewing ring and a boom, where the crane is mounted in the area of a transverse axis extending transversely to a longitudinal axis of the object, the object being designed with essentially mirror symmetry with respect to the transverse axis.

In one of the known embodiments, these types of devices are in the form of self-driven floating cranes, which are designed as heavy-lifting cranes. These floating cranes have only a transshipment function and are themselves not suitable for transporting containers, because only minimal storage areas are present on them. When these types of floating cranes are designed to rotate, they have their slewing ring underneath the vertical element, so that the entire crane can be swung about.

In the area of harbor facilities, the containers are loaded with the help of special, complicated traveling bridges, which are installed along the quay. On ocean-going vessels, special shipboard cranes are used to load and to unload the containers. The known devices, however, are not optimally designed for transporting containers on the water between the various installations within a harbor, because for this purpose it is necessary to use a barge or a pontoon without cargo handling gear, and the containers must be transferred two different times by means of the complicated traveling bridges. Horizontal transport within a harbor is therefore usually accomplished by means of road vehicles

A self-driven pontoon with loading crane for transporting containers in harbor installations is already known from DE-OS 102 21 460. This device, too, fails to meet all the requirements on operating flexibility, because in particular its maneuverability in tight access areas is still not optimal.

The object of the present invention is therefore to design a device of the type described above in such a way that economical and flexible container transport and transshipment between various harbor installations is supported, the device

also being able to deal with different sets of transshipment conditions at the installations in question.

This object is achieved according to the invention in that the crane is laterally offset from the longitudinal axis, and that, laterally next to the crane, a deckhouse with pilothouse is positioned, and in that the device is designed with basically mirror symmetry with respect to the transverse axis. As a result, the device does not have a fixed main travel direction ("double-end configuration"), which means that the demand for maneuverability is reduced to a corresponding degree.

Optimal positioning of the crane on the pontoon is ensured according to the invention in that the crane and the deckhouse with pilothouse are located approximately in the middle of the planned work area considered in the direction of the longitudinal axis.

Because the crane is laterally offset from the longitudinal axis, it is possible to provide the crane with a large work area on one side of the pontoon, and it thus also becomes possible for the crane to pick up containers located a longer distance away from the quay wall and to set them back down again there. If the device is docked at a quay

Jun 18 00 00:00
installation in such a way that the crane is located on the side of the device farther away from the quay wall, however, the crane can work more quickly, because the angle of rotation required for the transfer work is smaller.

The arrangement of the deckhouse with pilothouse laterally next to the crane leads to a compact design and to optimization of the available loading surface. Because the pilothouse is located approximately in the middle of the device considered in the longitudinal direction, the distances to the two ends of the device are comparatively short, which means that a clear view is possible during the maneuvering of the pontoon.

Because the floating object is designed as a pontoon, it is possible to combine the design of a floating object optimal for the transport and transshipment of cargo within harbor installations with the functionality of a loading crane. Because the slewing ring is located above the vertical element and a certain distance away from the deck of the pontoon, it is possible to ensure a space-saving, simple, and sturdy superstructure with high functionality and reliability even under harsh operating conditions. A slewing ring located under the crane column would have a much larger diameter and

Jun 18 00 07:00p

would take away a corresponding number of container storage spaces.

To ensure that the transport and transshipment gear has a high degree of mobility, the pontoon is provided with at least one drive assembly.

The control of the pontoon is facilitated in that the pontoon has an operator's station in the pilothouse, and in that this station is located at a level vertically above the highest point which the containers can reach.

To support relatively prolonged work phases, it is proposed that the pontoon be provided with at least one accommodation for crew.

Versatile maneuverability of the pontoon is supported in that the drive assembly/assemblies is/are connected to two thrusters.

In-place maneuverability of the pontoon is optimally supported in that a thruster is mounted at each end of the pontoon.

A high degree of course stability is achieved in particular in that the thrusters, one of which is mounted at each end of the pontoon, are asymmetric to the longitudinal axis in such a way that the thrusters facing essentially n

opposite directions are the same distance away from the longitudinal axis.

So that even heavy loads can be transported safely a high degree of structural strength can be achieved by providing the structure of the pontoon with reinforcement at least in the area where the crane is attached to the structure.

A typical design consists in that the pontoon has essentially the shape of a right parallelepiped.

Providing the crane with a structure which resists continuous loads will ensure universal and long-lasting operational reliability.

Exemplary embodiments of the invention are illustrated schematically in the drawings:

-- Figure 1 shows a side view of a floating pontoon with a drive and a container crane;

-- Figure 2 shows a front view of the device according to Figure 1 in an operating state, in which the boom of the container crane has been swung to the side over the deckhouse to pick up a container;

-- Figure 3 shows a plan view of the main deck; and

-- Figure 4 shows an embodiment with a two-part

deckhouse.

Figure 1 shows an exemplary embodiment of the device for transporting containers 1, designed here as a pontoon 2, on which a crane 3 is mounted. The pontoon 2 consists essentially of a right parallelepiped base element, which is stiffened by a structure 4. On the top, the pontoon 2 has a deck 5, on which the containers 1 are arranged. The pontoon 2 is provided with crew accommodations 7 and a pilothouse 29 located above the crew accommodations 7. A drive assembly 10 is connected to thrusters 11, 12. One of the thrusters 11, 12 is located at each end 6, 13 of the pontoon 2.

The crane 3 consists essentially of a vertical element 14, which is connected in the area of an element base 15 to the structure 4 of the pontoon 2. At the end facing away from the element base 15, the vertical element 14 carries a slewing ring 16, which supports a crane head 17 in such a way that it can swing horizontally relative to the vertical element 14. The crane head 17 holds a boom 18, which is supported so that it can pivot around a pivot joint 19 relative to the crane head 17. A pivoting of the boom 18 relative to the crane head 17 can be accomplished by the use of an adjusting cylinder 20.

Figure 1 shows the crane 3 in a base position, floating, and transporting the containers 1. In this position, the cable 22 of the crane 3 is wound up essentially all the way. At the end of the boom 18, the cable 22 is guided over a boom pulley 23. A cable winch 24 is located preferably inside the crane head 17.

To ensure that the containers 1 can be stowed safely even under the influence of forces acting laterally or transversely, the storage sites for the containers 1 are provided with cellular-type framing 31.

Figure 2 shows a front view of the pontoon 2 according to Figure 1 with the crane 3 in a working position, in which its boom 18 has been swung over the deckhouse 28. It can be seen that the crane 3 is laterally offset from the longitudinal axis of the pontoon 2. It was already obvious from Figure 1 that the crane 3 is located approximately in the middle of the intended working area considered in the direction of the longitudinal axis. It can also be seen from Figure 2 that the two thrusters 11, 12 are also offset from the longitudinal axis. In particular, the idea is that the two thrusters 11, 12 are offset from the longitudinal axis by the same amount, and that they are mounted on opposite sides of the longitudinal

axis.

In the operating state according to Figure 2, the crane 3 picks up containers from the quay 27 by means of load-lifting gear with an attached hook 26 and sets them down again in the area of the pontoon 2 after a corresponding pivoting movement. During the unloading process, this work cycle is reversed.

Arranging the crane 3 with an offset from the longitudinal axis offers the advantage of either maximum reach on the land side or of accelerated operation of the crane. Because a thruster 11, 12 is mounted at each end of the pontoon 2, it is possible both to maneuver the pontoon 2 in place and to move in the direction parallel to the quay 27. Because the thrusters 11, 12 are located asymmetrically with respect to the longitudinal axis, good course stability and high efficiency are achieved.

It can also be seen from Figure 2 that the pilothouse 29 with the operator's station 8 and the crew accommodation 7 are located in the area of a deckhouse 28. The drive of the pontoon 2 is controlled from the operator's station 8. The crane 3 is operated from the crane console 32.

A height-adjustable gangway 33 is provided so that the pontoon 2 can be accessed regardless of the load it is

carrying and of differences in the heights of the quay walls.

In a plan view of the deck 5, Figure 3 shows that the crane 3 is laterally offset from the longitudinal axis 25 and that the deckhouse 28 is adjacent to the crane 3. It can be seen in particular that, in the exemplary embodiment illustrated here, both the crane 3 and the deckhouse 28 are arranged on a transverse axis 30 extending transversely to the longitudinal axis 25. As a result, the deckhouse 28 is located laterally next to the crane 3. It can also be seen that the pontoon 2 has an essentially symmetric design with respect to the transverse axis 30. As a result, optimum use can be made of the working space in the area of the deck 5, and optimal use of the crane 3 can also be promoted.

A high degree of maneuverability of the pontoon 2 can be achieved by locating two thrusters 12 at one end 6 of the ship symmetrically to the longitudinal axis 25. The maneuverability can be increased even more by providing two more thrusters 11 at the other end of the ship 13 with mirror symmetry with respect to the longitudinal axis 25.

Figure 4 shows an embodiment in which a deckhouse 28 consisting of two house segments 33, 34 is provided on the pontoon 2, which transports the containers 1. The house

segments 33, 34 are located on opposite sides of the crane 3, preferably at equal distances from the crane 3. The arrangement of the house segments 33, 34 on two sides of the crane 3 in the exemplary embodiment shown here is done in such a way that the house segment 33 faces one end 6 of the pontoon and that the house segment 34 faces the other end 13 of the pontoon. As a result of this arrangement of the house segments 33, 34, additional storage room for containers 2 is created on the deck 5 laterally next to the crane 3 in the direction transverse to the longitudinal axis 25.

As needed, the house segments 33, 34 can be connected to each other by walkable open or closed bridges.

C L A I M S

1. A floating, self-driven device for transporting and transshipping containers, which is designed as a floating object and is provided with at least one crane comprising at least one vertical element, a slewing ring, and a boom, where the crane is located in the area of a transverse axis (10) extending transversely to the longitudinal axis of the object, wherein the crane (3) is laterally offset from the longitudinal axis (25), and in that a deckhouse (28) with pilothouse (29) is positioned next to the crane (3).

2. A device according to Claim 1, wherein the floating object is designed as a pontoon (2).

3. A device according to Claim 1 or Claim 2, wherein at least one of the vertical elements (14) is rigidly connected to a structure (4) of the pontoon (2).

4. A device according to one of Claims 1-3, wherein the slewing ring (16) for the pivotable support of the crane head (17) which holds the boom (18) is installed at the end of the vertical element (14) facing away from the structure (4) of the pontoon (2), a certain distance away from a deck (5) of the pontoon (2).

5. A device according to one of Claims 1-4, wherein the pontoon (2) is designed with essentially mirror symmetry with respect to the transverse axis (30).

6. A device according to one of Claims 1-5, wherein cellular-type framing (31) is provided in the area of at least some of the storage sites for the containers (1).

7. A device according to one of Claims 1-6, wherein the pontoon (2) is provided with at least one drive assembly (10).

8. A device according to one of Claims 1-7, wherein the pontoon (2) has an operator's station (8), which is located at a level vertically above the highest point which the containers can reach.

9. A device according to one of Claims 1-8, wherein the pontoon (2) is provided with at least one crew accommodation (7).

10. A device according to one of Claims 1-9, wherein the drive assembly/assemblies (10) is/are connected to two thrusters (11, 12).

11. A device according to one of Claims 1-10, wherein one thruster (11, 12) is provided at each of the two ends (6, 13) of the pontoon (2), and where the thrusters (11, 12) are each located at essentially the same distance from the

longitudinal axis (25).

12. A device according to one of Claims 1-11, wherein the thrusters (11, 12) are located asymmetrically with respect to the longitudinal axis (25).

13. A device according to one of Claims 1-10, wherein two thrusters (11, 12) are provided at each end (6, 13) of the pontoon.

14. A device according to one of Claims 1-13, wherein the structure (4) of the pontoon (2) has structural reinforcement at least in the area where the crane (2) is attached.

15. A device according to one of Claims 1-14, wherein the pontoon (2) has essentially the shape of a right parallelepiped.

16. A device according to one of Claims 1-15, wherein the crane (3) has a design which resists continuous loads.

17. A device according to one of Claims 1-16, wherein the pontoon (2) is provided with a height-adjustable gangway (33).

18. A device according to one of Claims 1-17, wherein the crane boom (18) can be swung over the deckhouse (28).

19. A device according to one of Claims 1-18, wherein the deckhouse (28) is formed out of two house segments (33, 34), which are located next to the crane (3), on opposite sides.

20. A device according to Claim 19, wherein container storage sites are located next to the crane and next to the house segments in the direction transverse to the longitudinal axis (25).

21. A device according to one of Claims 1-20, wherein the house segments (33, 34) have at least one walkable connection between them.